

REMARKS

In response to the Office Action mailed December 20, 2004, Applicants amend their application and request reconsideration. No claims are cancelled and claims 16-18 are added in this Amendment so that claims 8-12 and 16-18 are now pending.

In this Amendment claims 8, 10, and 12 have been amended for clarity by correcting terms that inadvertently lacked antecedent basis. No examined claim is substantively amended. Claims 8-12 and 16 encompass at least the Second Embodiment of the patent application described with respect to Figures 22-33 of the patent application. The claims may also encompass other disclosed embodiments of the patent application.

In the embodiment of Figures 22 and 23, there are two lead frames, 14 and 15, including respective lead portions 14a and 15a and respective die pad portions 14b and 15b. These die pads are relatively complex and include at least two parts, for example an opposing portion 54b and an extension 44b in the case of the die pad 14b. In the embodiment of those figures, there are three layers of adhesive die bonding material 17 that intervene in the supporting arrangement of that embodiment. The central layer of the die bonding material bonds the first semiconductor chip 1a to the die pad 15b, bonds the first semiconductor chip 1a to the second semiconductor chip 1b, and bonds the second semiconductor chip 1b to the die pad 14b at the extension 44b. The other two layers of adhesive respectively bond the semiconductor chip 1a to the die pad 15b and the semiconductor chip 1b to the die pad 14b. Those two adhesive layers provide other bonding connections between the two die pads 14b and 15b. The patent application describes other arrangements of connecting the die pads to each other for support. In the terms of claim 8, the lower semiconductor chip is supported by the first die pad and the upper semiconductor chip is supported by the second die pad, with the two chips partially overlapping each other and overlapping, in height, the first and second lead portions.

The first adhesive layer, corresponding in the embodiment of Figure 22 to the central die bonding material 17, is mentioned in new claim 16.

Claims 8-11 were rejected as anticipated by Chun (U.S. Patent 6,043,430). This rejection is respectfully traversed.

No claim can be anticipated by Chun because Chun does not disclose every element of the claimed invention. As previously pointed out, Claim 8 is most easily understood in combination with the perspective and sectional views of Figures 22 and 23 of the patent application illustrating an embodiment that falls within the scope of that claim. The first lead frame is element 14 in that figure and the second lead frame is element 15. As can be best appreciated from Figure 23, as described in claim 8, each of the lead frames has a die pad and a

lead portion which are not coplanar, identified as elements 14b and 14a, respectively, for the lead frame 14. As is conventional in the art, the die pad part of the lead frame is bonded to a semiconductor chip, i.e., supports the semiconductor chip. For example, the die pad 14b supports the chip 1b and is bonded to that chip. By contrast, the lead portion 14a provides a base for making wire bond connections, such as shown by the wires 5 in Figures 22 and 23. As mentioned in new claim 17, an interesting feature of the illustrated embodiment is that the lead portion of one lead frame to which a first of the semiconductor chips is bonded, has wires connected to the lead portion of the other lead frame. The important point to be understood, however, with regard to claim 8, is that the die pad of each lead frame provides support to one of the chips and each chip is partially surrounded by one of the lead frames. Further, opposite sides of each semiconductor chip are sandwiched between a lead portion and the die pad of one of the lead frames. See new claim 18.

In applying Figure 7 of Chun to reject claims 8-12, the Examiner compared the lead frame part 23' of one of the semiconductor chips of Chun to the lead portions of claim 8. The die pads of claim 8 were compared to the leads 23 of Chun. This comparison is inaccurate not only because every element 23, with or without a prime notation, is in Chun, a lead, not a die pad. The difference lies not only in nomenclature but also in function. It is apparent that the leads 23 are exposed at the surface of the resin encapsulation 25 of each of the stacked elements in Figure 7 of Chun. That exposure is essential for electrical interconnections between those stacked chips. Moreover, the interconnection of the two sets of leads on each side of each chip provides, essentially, from either lead the wire bonding interconnections that are made only on one side of each of Chun's semiconductor chips. Stated another way, the lead 23 in Chun that the Examiner compared to a die pad is no more than an electrical extension of the lead 23' to which wire bonds are made. In other words, there are not in Chun any true die pads either by name or function so that Chun cannot anticipate claim 8.

Applicants specifically traverse use of the Manual of Classification as a source of art-accepted definitions of terms such as "lead frames". Reliance on that document to support the rejection is improper for several reasons. That document is prepared only for the convenience of the U.S. Patent and Trademark Office in sorting patent applications and is not required to have any relationship to art-recognized definitions or special definitions given by an Applicant in a patent application. Moreover, that document is devoid of figures or other helpful explanations of what terms means. The text of the Manual of Classification can be misleading, as it has been here.

Further, if that citation to the Manual makes it a secondary reference, no citation appears anywhere on the PTO-892 Form to the Manual and no copy of any portion of whatever edition of the Manual that is being relied upon has been supplied as a non-patent literature document.

Finally, the element of claim 8 that is in contention is the “die pad” not the “lead frame”. Therefore, the citation to the Manual of Classification as to “lead frame” is not pertinent to the patentability of claim 8 vis-à-vis Chun.

Claim 12 was rejected as obvious over Chun, considered by itself. It is clear that this rejection is founded upon the assertion that claims 8 and 11, from which claim 12 depends, are anticipated by Chun. This rejection is respectfully traversed. Since the assertion that claims 8 and 11 are anticipated cannot properly be maintained, the rejection of claim 12 fails with the withdrawal of the rejection of claims 8 and 11.

Further, Applicants disagree with the Examiner’s position that nothing of importance is achieved by the dimensional relationships described in claim 12. As described throughout the patent application, an important objective of the invention is to reduce the thickness of a semiconductor device that incorporates two semiconductor chips. That result is achieved in the invention, in part, through the dimensional relationships of claim 12, so that those relationships are significant.

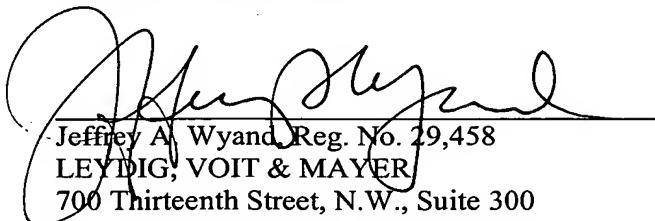
A lengthy discussion could be provided as to how the invention as defined by new claim 16 differs from what is disclosed in Chun. However, it is sufficient to point out that Chun describes no adhesive material, regardless of electrical characteristics, that is commonly in contact with two of the semiconductor chips and bonds those chips to each other.

Claims 17 and 18, like claim 16 from which claims 17 and 18 depend, are supported by the embodiments illustrated in Figures 22 and 23 of the patent application. Neither of the features of these claims is disclosed by Chun. Thus, all of claims 16-18 are clearly patentable over Chun without regard to the patentability of claim 8.

In re Appln. of ABE et al.
Application No. 10/810,813

Since this amendment distinguishes the invention from the prior art, it places the application in form for allowance which is earnestly solicited.

Respectfully submitted,



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